Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Federal-State Joint Board on	)	CC Docket No. 96 - 45
Universal Service	)	
	)	

REPLY COMMENTS OF
AMERICAN LIBRARY ASSOCIATION

1. INTRODUCTION

The American Library Association (ALA) respectfully submits these Reply Comments to elaborate on and clarify points that have been raised previously in our comments and those of the other filers regarding the above referenced proceeding. In its original set of comments, filed April 10, 1996, ALA proposed that the Federal-State Joint Board on Universal Service make the following recommendations:

- That the definition of discounted special services for libraries and schools include all telecommunications services available commercially by tariff or through contract.
- That particular attention be given to support high bandwidth, interactive applications in libraries and schools.
- That the discount rates for telecommunications services be the lower of either 1) the lowest price offered to any customer or 2) a wholesale price or fair cost price that would be based on the service's total long run incremental cost.
- That additional discount support be made available for libraries in rural, insular, and other high cost areas as well as in low income areas.
- That the definition of core universal services support convenient and reliable residential access to networks such as the Internet and other online services and that libraries and schools be eligible for support for core services.
- That certification and eligibility requirements be efficient, provide accountability, and include libraries and schools that participate in cooperative network arrangements.

In its reply ALA wishes to focus on the following areas.

2. The definition of discounted services for libraries and schools should include all telecommunications services available commercially by tariff or through contract.

ALA is in agreement with Ameritech's position with regard to a definition of special services that is determined by the marketplace. ALA proposed in its original comments that any telecommunications service offered commercially through tariff or by contract should be made available to libraries and schools at a discounted rate. Ameritech noted in its filing that "different libraries and schools undoubtedly will want different functionalities."[1] Libraries certainly differ along many dimensions. At present. 44.6% of public library systems[2] are connected to the Internet.[3] Libraries also serve a variety of communities throughout the United States. Of the 15,893 public library facilities in the United States, approximately 52% serve areas that are outside metropolitan areas.[4] Libraries are at different points on the technology curve and serve different types of communities. They should not be precluded from using the telecommunications services that are best suited to their needs.

Furthermore, by making any commercially available service eligible for discounts, the regulatory burden of having hearings and proceeding on what services should be defined as

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[1]Ameritech's Comments. *CC Docket No. 96-45.* p. 15 April 12, 1996

[2]Throughout this Reply Comment, we use the term "public library systems" to refer to administrative entities comprising one or more public library facilities. A public library system may be a single library facility or a main library and branch libraries that are under a single administrative organization.

[3]Peter Young, Executive Director, National Commission on Libraries and Information Science, *NCLIS public Library Survey Results 1996*, py_nclis@inet.ed.gov (April 11. 1996).

[4]GOVERNMENTS DIVISION, BUREAU OF CENSUS FOR NATIONAL CENTER FOR EDUCATION STATISTICS, DIGEST OF EDUCATION STATISTICS: 1993 (1995)

special services is avoided. This is important given that an additional 22.16% of public library systems, nearly 2000 library systems, plan to connect to the Internet within the next 12 months.[5]

3. The discount rate for libraries and schools should be the lower of the total service long run incremental cost for the service or the lowest price offered commercially.

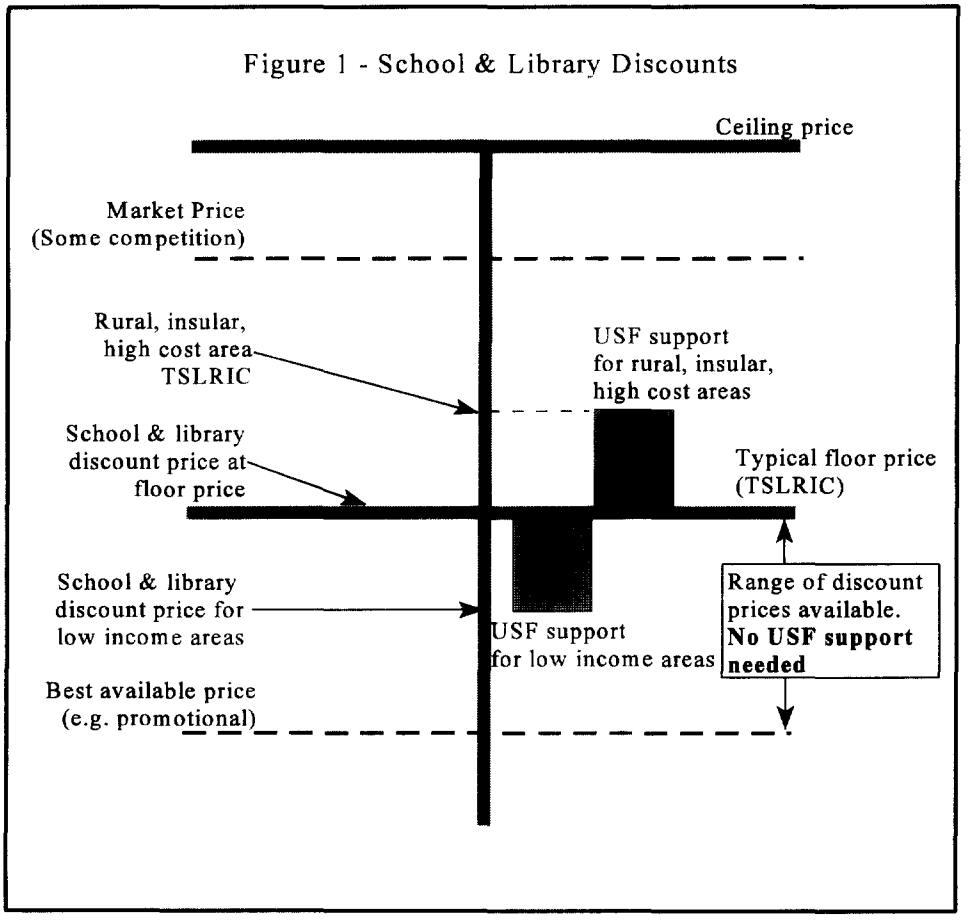

Figure 1 above demonstrates how discounts for libraries and schools would be implemented. The discounted price offered to all libraries and schools for any commercially available telecommunications service should be the floor price for that service, equivalent to the total

[5]Young, *supra* note 2

service long run incremental cost (TSLRIC), or the lowest commercial price offered by the provider (e.g. a promotional price), if lower. Typically, the discount price for libraries and schools in most areas would likely be set at the TSLRIC for the service. **In either case, no support would be needed from a universal service fund (USF).** In rural, insular, and other high cost (RIHC) areas the high cost area TSLRIC might be prohibitively high in which case USF support would be used to bring the actual price paid down to the typical or average TSLRIC rate for low cost areas. In areas of low income, where even a typical TSLRIC rate might price service out of the reach of local libraries and schools. USF support would be used to make service affordable.

Under normal market conditions, the range of prices a telecommunications service provider would offer for a given service would fall somewhere between the market price, which is the maximum price the provider could charge and still make a sale, and the floor price, which is the minimum price a provider could charge and still cover the total cost of the service. This minimum price is the total service long run incremental cost (TSLRIC) of the offered service. In any market, there will exist a prevailing or equilibrium market price. In a truly competitive market where there are many sellers of a service, the market price should be close to or at the TSLRIC price.

3.1 The total service long run incremental cost is a fair discount price.

The true economic costs of supply for any market sector have been found to be the provider's TSLRIC.[6] These are the costs the firm would incur using the current least cost

[6]See Appendix B.

technology and operating methods available for service provisioning. In some cases, the "current least cost technology" is actually technology that is presently being employed. Appendix A is an example from New England Telephone, a subsidiary of NYNEX, which shows a TSLRIC calculation. On page 6 of the appendix, NET "determined from its cost records the actual cost and capacity of each component within the cost area" for calculating the local loop costs associated with providing service. In a recent tariff adjustment proceeding involving U.S. West, the Washington Utilities and Transportation Commission ruled:

> The Commission finds, consistent with the presentations of most parties that addressed cost issues, that the appropriate measure of costs is Total Service Long Run Incremental Cost (TSLRIC). The Commission has found this measure of costs to be appropriate in prior cases. Incremental costs are appropriate because they measure the additional costs that are incurred by providing an additional service TSLRIC therefore represents the economic price floor.[7]

This methodology has been widely supported, e.g. by state commissions, telecommunications companies, and internationally A sampling of these entities is provided in Appendix B.

The TSLRIC costs for a service are costs that would be avoided if the firm withdrew from offering the service. TSLRIC figures include the opportunity cost or return that would be earned on the funds or capital that must be committed by the decision to provide service. **As long as the market price is equal to or greater than a firm's TSLRIC, that supplier is doing at least as well in offering the service in the given market sector as it could do in its next best supply alternative.**

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[7]Washington Utilities and Transportation Commission. *Docket No. UT-950200.* p. 81 April 11, 1996.

TSLRIC acts as a pricing floor for the firm. If the prevailing rate falls below this level, a carrier would be economically irrational to continue to offer service, unless it were somehow compensated for the difference between what users are currently paying for service and TSLRIC. Such compensation could be furnished by governmental mechanisms. For instance, if all suppliers had to contribute to a universal service fund (USF) mechanism, e.g., as a proportion of their total revenues, **then some services could be priced below TSLRIC without disadvantaging the designated provider competitively.** Where market price is above TSLRIC, a supplier can utilize the difference or net revenues generated in this service sector to cover a portion of the firm's shared and common (SAC) costs. These costs are distinguishable from TSLRIC in that they would not be avoided by discontinuing service.

In some situations a firm will have good reason to offer some of its customers a price that is lower than the prevailing market rate. It may do so for promotional reasons, in order to meet the price of a new entrant or to "tie-up" a major user's business by contract for many years because of volume considerations, or for strategic reasons. These include stimulated customer usage or market growth and the lower unit costs that it would accrue thereby, as well as the expected increase in the use of corollary, higher margin services that the firm is offering.

Telecommunications providers would receive the benefits of stimulated customer usage and enhanced market growth while recovering the full cost of providing services to schools or libraries. Under the ALA proposal, usually, telecommunications providers will be recovering their full cost without the need of additional support from a USF. **This eliminates the need for a large USF, (and supporting administrative structure) and frees up funds, e.g. for**

investment, that telecommunications providers might have to otherwise contribute to a USF.

At the same time, by providing services at the TSLRIC rate, more resources are available for libraries and schools to devote to other needed infrastructure components such as equipment, software, ongoing operational support, and training. In 1993, over 40% of library systems had annual operating expenditures of less that $50,000, and over 54% of library systems had annual operating expenditures of less than $100,000. Only 9.6% of library systems had annual operating expenditures in excess of $1,000,000.[8] By freeing up resources for other infrastructure components, the introduction and availability of the information superhighway to the public can be accelerated. The use of TSLRIC as the basis for school and library discounts provides a "win-win" situation for both telecommunications providers and the public.

3.2 ALA suggests how to implement discount prices for libraries and schools.

Referring back to Figure 1, in non high cost areas, typically, the provider would be required to offer a discount price equivalent to the floor price. Using TSLRIC to calculate the floor price would ensure that the provider recovers its full cost, including the cost of capital. The provider would be required to certify that the discount price offered was indeed the lower of the TSLRIC price or the lowest price offered commercially.

In rural, insular, or high cost (RIHC) areas, the provider would offer its best price for a service, again the lower of either the TSLRIC price or the lowest price offered by the provider.

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[8]National Center for Education Statistics, *Public Libraries in the United States: 1993*, p. 70 (September, 1995)

Assuming that the provider's best price is their TSLRIC price, it would be compared to the average TSLRIC price for that service offered to libraries and schools in low cost areas. If the best price was above this average, the difference would be made up from a USF. This would promote equalization between low cost and high cost areas

In low income areas, where even the typical TSLRIC price may still be out of the reach of libraries and schools, USF support can be provided to make up the difference between the TSLRIC price and the amount that is affordable by the local school or library. This affordable amount could be set for example as the percentage of the budget that typically goes towards telecommunications services. The Kickstart Initiative report, for example, set this figure at 4% of a library's budget for initial deployment costs and 9% for ongoing costs for libraries.[9] ALA feels that this could be one approach for establishing support in low income areas.

To summarize:

1. Only services that are already commercially available in the area would be offered; thus a TSLRIC calculation for the service in that area could be, and should have been, made.

2. The sale of services to libraries and schools at the TSLRIC rate covers the full cost of the service and provides added direct revenues to the telecommunications company.

3. Pricing discount rates at TSLRIC eliminates the need for a large USF and minimizes providers' contributions towards such a fund.

4. If a high cost area provider's TSLRIC price is above the average TSLRIC price for similar service in low cost areas, additional price support would be provided from a universal service fund to which all eligible carriers would contribute. The

[9]U.S. ADVISORY COUNCIL ON THE NATIONAL INFORMATION INFRASTRUCTURE, KICKSTART INITIATIVE: CONNECTING AMERICA'S COMMUNITIES TO THE INFORMATION SUPERHIGHWAY P. 96 (1996)

amount of support would be the difference between a provider's TSLRIC for that high cost area and the average TSLRIC price of similar service in low cost areas.

5. The ALA proposal is largely self regulating. Providers must certify that the discount price they are offering is either at TSLRIC or a lower price. In either case, providers will have calculated and justified the discount price. In high cost areas or low income areas, since support will be coming from a USF to which many providers will be contributing, there will be a natural incentive for fund contributors to monitor and verify the discount rates.

4. Additional discount support should be made available for libraries in rural, insular, and other high cost areas.

The Telecommunications Act of 1996 (the Act) provides for additional discounts for rural, insular, and high cost areas (RIHC) to equalize prices based on the presumed difference in the cost of providing services. In the case of special services, the difference between rural service and urban/suburban services can be particularly high. For example, the Colorado State Library noted in its filing that

> the only statewide provider of Internet access charges drastically different rates for rural and urban customers. A person living in an urban area pays a flat fee of $15 per month, for five hours of service ... Rural customers, however, pay $13.00 an hour... Such rate variability means that people in rural areas do not have equitable access to the vast resources on the Internet.[10]

To address this problem, equalization would be achieved by providing a subsidy equal to the difference between the high cost area provider's TSLRIC and the average TSLRIC for that same service in low cost areas.

The second basis for providing additional discounts is "Lifeline" or low income adjustments that are made based on the customer's ability to pay. For example, the U.S. Census Bureau has

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[10]Colorado Department of Education, State Library and Adult Education Office Comments. *CC Docket 96-45*. p. 2. April 19, 1996.

defined "poverty areas" as those census tracts or block numbering areas (BNAs) where at least 20% of residents were poor in 1989.[11] According to U.S. Census Bureau figures approximately 14,390 census tracts or BNAs out of 61,258 in the United States or 23.49% were poverty areas.[12] Because residents in these areas are even less likely to have access themselves to telecommunications and information services, more of a burden is placed on schools and libraries to provide access to the community.

Discounted rates for special services to libraries and schools in rural, insular, and high cost (RIHC) and low income areas are especially critical. Libraries in many such areas may be the only point of access to high speed data services and resources, many of which may be important to preserving or improving the quality of life for residents in those localities, stimulating local development, providing job opportuntities, education, and meeting a host of other information needs.

We view the role of libraries as instruments of universal service. They collectively invest in and provide access to valuable, specialized high end information services and resources. In RIHC or low income areas, libraries serve as the community information center, the principal resource and contact point between the community and the national and global information stream. These information centers will support life-long learning, adult literacy, and distance adult educational applications.

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[11]Bureau of the census, *Poverty Areas*, http://www.census.gov/ftp/pub/socdemo/www/povarea.html (May 2,1996)

[12]LEATHA LAMISON-WHITE, HOUSING AND HOUSEHOLD ECONOMICS DIVISION, BUREAU OF CENSUS, *All States Tracts With Poverty Rates of 20% or More.* (forthcoming May 1, 1996).

In particular, the following points need to be made:

4.1 High end services are critical to these communities, but will be difficult to obtain.

High cost will be a significant barrier to widespread access, as will the lack of expertise in setting up and running high speed networks. Although universal service policies for rural, insular, and high cost regions should manage to keep charges for core service low, it will not have the same effect on advanced services, which, due to smaller markets, will be more expensive than they would normally be in more populated and competitive markets. Yet, these services are important to provide to the communities.

Farmers and small business operators, for instance, can use a library equipped with a high speed link to access up-to-date weather information. satellite photos that may show pest damage or drought conditions, sophisticated computer simulations and analytical models, real time video conferencing with specialized experts at university research centers and government laboratories, and access to government reports and documents.

In Georgia, for instance, through the University of Georgia's data base access project named GALILEO (Georgia Library Learning Online), orchard owners check weather conditions, fruit and vegetable prices, and search for new markets on the Internet.[13]

4.2 Libraries are at the leading edge of technology deployment.

Libraries in RIHC and low income areas will also create greater markets for advanced services. Because they coalesce existing demand that sits below the price threshhold, they create

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[13]Alan L. Kaye,Director, Rodenbery Memorial Library. Cairo, Georgia, *Rural Technology*, akaye@mail.public.lib.ga.us, (April 11, 1996).

a market. To the extent that they expose users to new services and train them in their use, libraries are also secondarily increasing market potential. Hence, discounts to libraries will help accelerate the deployment of an advanced infrastructure into rural and insular, often non-competitive areas, and, thereby, nationalize them--a key overall objective of U.S. telecommunications policy.

5. Certification and eligibility requirements should not be onerous, should provide accountability, and should include libraries and schools that participate in cooperative network arrangements.

The certification procedures proposed by NYNEX and others are defective and unworkable.

5.1 By inserting another layer of eligibility for libraries and schools to qualify for discounts, the NYNEX certification plan runs counter to the intent and wording of the law

The law requires offering discounts on special services to any "bona fide" request. ALA takes that language to mean that the request is from an authorized official of an eligible institution and nothing more. Discounts should not be administered as a grant program, in which recipients must apply and have their application reviewed according to some federally established standards. In fact, the proposed certification plan even requires the establishment of a new federal government entity without a single word of authorization appearing in the Act and without reference in the legislative record.

5.2 The NYNEX plan transfers decision making that properly belongs at the community level to state and federal levels.

The purpose of libraries is to meet the diverse information needs of the communities they serve. These needs can vary enormously according to geography, economics, demography, and other characteristics of those communities. Consequently, the information technology needs of

those communities will also be quite diverse, as NYNEX argues persuasively in its own filing. Libraries are accountable to their own local boards to see that the services and information resources they offer are appropriate to their local communities. The proposed certification process, based on approval by comparing local plans with a "national vision," would take those decisions out of the hands of local boards and librarians, where accountability belongs, and place them at the mercy of state and federal bureaucracies.

The principal effect of the Joint Board/ FCC's ruling should be to empower, not disempower local decision making. The NYNEX plan would have the opposite effect.

5.3 The NYNEX procedure creates another layer of bureaucracy and administrative processes for libraries and schools.

Librarians, teachers, and administrators, particularly in the public sector, are already heavily overburdened with increasing demands for regulatory reporting, yet have decreasing financial and staff resources to meet them. The proposed certification procedure would impose an unnecessary additional cost burden in terms of staff time, funds, and delays; the effect of this would at least partly undo the incentives and advantages conferred by the discount in the first place. Indeed, this proposal calls for the creation of another ongoing federal government body, the Educational Telecommunications Board, with all the attendant costs, at a time when the focus of the nation is to limit the size of federal government and push policy making to local levels.

5.4 The NYNEX plan injects FCC and PUCs into local education and library policy making.

We think it is quite appropriate for the FCC and PUCs to concern themselves with improving access of the nation's libraries and schools to telecommunication services. We

applaud the Congress for the language in the Act that authorizes them to do so, and we welcome this rule making. We do not think, however, that it is necessary, appropriate, or arguably, even legal, for communications regulatory bodies to inject themselves into setting standards for education or library services or operations as this proposal does.

5.5 In the ALA plan, accountability for use of these discounts rests in the hands of those best equipped to exercise it, local library administrators and boards.

Even were the discounts suggested by the ALA to be set as policy by the FCC and Joint Board, libraries and schools would still face significant expenditures. Many special services, in particular, would still be expensive to maintain, and the costs would be recurring. Furthermore, as several commentators noted, communications is only one part of the complete picture. To provide public access to advanced information services in a library requires expenditures for substantial computer and local networking equipment, printers, and scanning devices. Labor costs are needed to set up and manage the facilities, to support and counsel users, to maintain web pages and local information services, and to train library staff.

Faced with these expenses, library administrators and boards have always been careful to allocate resources to services that effectively meet the needs of their communities. Indeed, the problem would be the reverse -- how to encourage libraries and schools to move ahead rapidly into the electronic information age in the face of severe budget pressure.

5.6 ALA recommends flexible library eligibility and certification requirements.

It is critical that the Joint Board and FCC adopt rules for eligibility that allow and encourage collaborative arrangements by assuring that discounts are available to consortia of eligible organizations. In its original filing, ALA pointed out the important role played by

library systems, agencies, cooperatives, consortia, and networks in spurring library use of new technology and aggregating demand.

The comments filed by the Lincoln Trail Libraries System illustrate a typical multitype library system as found in several states:

> Lincoln Trail Libraries System is a state sponsored organization serving the libraries of 116 members in East Central Illinois. Academic, public, school, and special libraries participate as members. Lincoln Trail member facilities are spread over approximately 250 buildings in a nine county area. This area is largely rural. The median population served for participating school districts is 795, and the median size for participating public libraries is 3,042. The median budget of all participating libraries is $54,000, with some annual budgets as low as less than $10,000 per year.[14]

> Here is another description from the North Of Boston Library Exchange:

> Our consortium...was founded 15 years ago by five foresighted public libraries, and has grown to 25 public and college libraries, serving over 550,000 residents and college students. Member libraries share resources through a common database and computer system linked by dedicated data lines, and share electronic access to a periodical database. Access to the Internet is provided jointly by the consortium, a non-profit 501(c)(3) corporation which is controlled by the member libraries. Only libraries participate in these efforts, and services are not resold.[15]

The Colorado State Library stated in its filing that it is "critical that any discounted rates apply to public networks sponsored by libraries. These cooperative networks provide public access to library and other information resources. They increase the ability of libraries to share resources in a way that benefits all library users."[16] Appended to the Colorado State Library filing was a description of ACLIN, the Access Colorado Library and Information Network that

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[14]Lincoln Trail Libraries System, Comments. *CC Docket No. 96-45*, p. 1 April 5, 1996.

[15]North of Boston Library Exchange, Inc. Comments. *CC Docket No. 96-45*. p. 2. April 4, 1996.

[16]Colorado Department of Education, State Library and Adult Education Office Comments. *CC Docket No. 96-45*. p. 2. April 19, 1996.

provides access to the information resources of the libraries across the state, including 175 public, academic, school, and specialized library catalogs.

Certification procedures should be simple and straightforward. In many cases, a simple certification that the request by a library to a carrier for service at a discount is being made by a bona fide official empowered to order telecommunications services for the library should be sufficient, especially for a discount to a TSLRIC rate that does not involve a USF transaction. However, further assurance of eligibility may be desirable, since discounted rates for libraries in RIHC and low income areas may be below cost, and considering the range and variety of library cooperative and network arrangements for technological services and library resource sharing.

The simplest way to provide a further level of certitude regarding eligibility and use for educational purposes would be to require the requesting library or library entity to provide certification from the state library administrative agency. These agencies are responsible for library development throughout their states, and administer the Federal Library Services and Construction Act interlibrary cooperation and resource sharing program to which the Telecommunications Act of 1996 ties library eligibility. These agencies could indicate that the library or library entity is or is not eligible to receive state-based services under LSCA title III. The Washington State Library suggested such a mechanism in its filing.[17]

The rules regarding resale should distinguish between the telecommunication facilities and services offered using those facilities. The Washington State Library comments also suggest:

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[17]Washington State Library Comments. *CC Docket No. 96-45*. p. 16. April 9, 1996.

> the FCC should seriously consider separating the telecommunications **mechanisms** that make an electronically based service possible (the tool) from the **service** itself (the product) in applying the 'no resale' prohibition. For instance, a library may not resell its discounted access to its city government, but it may levy a fee for Internet classes, or setting up and maintaining an Internet account through the library, or for maintaining a web site for its unit of local government. Such an application would appear to satisfy the intent of the Telecommunications Act, but this distinction would be more easily known and understood by all concerned if the FCC clarifies it.[18]

Eligible institutions participating in consortia with non-eligible partners should qualify for appropriate discounts to the extent that they follow accounting procedures that clearly separate telecommunication costs among the participants. The Washington State Library indicates:

> A spot check of several library systems in Washington who do share networked services with other, ineligible partners (most often, a unit of local government) revealed that the library's portion of telecommunications charges can usually be readily separated from those of other partners in a network. If the FCC and the Joint Board have lingering concerns in this area, the FCC may wish to require separate, auditable records of the library's portion of a networked arrangement.[19]

ALA urges that serious consideration be given to these common sense recommendations by the Washington State Library.

The American Library Association Comments are endorsed by the American Associations of Law Libraries, Association of Research Libraries, Chief Officers of State Library Agencies, and the Urban Libraries Council. ALA thanks the Commission for its time and stands ready to assist in whatever way it can in the coming proceeding.

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[18] *Id.* at 17.

[19] *Id.* at 17.

Respectfully submitted,

AMERICAN LIBRARY ASSOCIATION

By: Carol C. Henderson

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May 7, 1996

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April 15, 1992

Charles A. Jacobs
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242 State Street, State House Station 18
Augusta, Maine 04333-0018

Re: PUBLIC UTILITIES COMMISSION, Inquiry of New England Telephone Company's Revenue Requirement, Cost of Service and Rate Design, Docket No. 91-200

Dear Mr. Jacobs:

Enclosed for filing in the above-captioned docket please find an original and 16 copies of two corrected pages for the Maine Marginal Cost Study filed on April 6, 1992. NET since filing has noted two typographical errors. The first error appears at Part 1 (MCS Overview), Page 14, Table 2, in the "Marginal Cost" column at the line for "Line Haul." The cost listed in the filed copy is $0.036; the cost should read as $0.0036 as it does in the attached corrected page. The second error appears at Part 2 (Network Cost Center Overview), Page 4, Table 2.1, in the "Marginal Cost" column at the line for "Line Haul." The cost listed in the filed copy is $0.036; the actual cost should read as $0.0036 as it does on the attached corrected page. The error was purely typographical and did not effect other cost calculations contained in the study.

Please return a date stamped copy of this letter to indicate filing. If you have any questions, please call me at (617)743-6809. Thank you for your attention to this matter.

Sincerely,

Richard P. Owens

cc: C. Cohen, Esq.
W. Black, Esq.
All other parties (letter only)

MCS Overview

The role of the marginal cost study (MCS), from the Company's viewpoint, is to inform the development of rates. The Company believes that its rates should reflect its long-run costs; not only does this send the proper price signals to customers about the cost of various services so that they can choose correctly, but it is also a prerequisite to an efficient and fair competitive marketplace. Consequently, the Company views its MCS as a significant document that will assist in the development of rates which reflect future costs.

The results of the MCS are an important component, though by no means the only component, in determining rate structures. Clearly, no rate should be set below the Company's marginal cost because it would encourage uneconomic consumption of the Company's services, and would, in fact, result in an economic subsidy of that rate by other rates. Additionally, because marginal costs are so low relative to embedded costs, all rates cannot be set at marginal cost.

It is the Company's belief that rates and cost must be considered together since they are inextricably intertwined by the very purpose for undertaking a cost study. Neither the Commission, nor the Company, can develop an appropriate and consistent set of tariffs without reference to the Company's marginal costs. Thus, along with considerations of equity and rate impacts, marginal costs must be known and considered in designing rates.

The Company's marginal cost study (MCS) is presented in three parts. The first part is this overview, which provides a summary explanation of the MCS process and results. The second part is the Network Cost Center Overview, which provides the next level of detail on the process and results of the MCS. Finally, part three is the MCS Detail, which contains the detailed explanations and data of how the Company calculated each marginal cost.

APPENDIX A

Throughout the presentation of the MCS, the Company has tried to make its effort understandable and clear. There are many graphics depicting the Company's process, and the Company cross-referenced information as much as possible. The Company anticipates this process will facilitate review and understanding of the MCS by all parties.

The Company's Network

The purpose of the telecommunications network is to transmit information from one point to another, a simple concept. Figure 1 shows, schematically, a representation of the Company's Maine network.

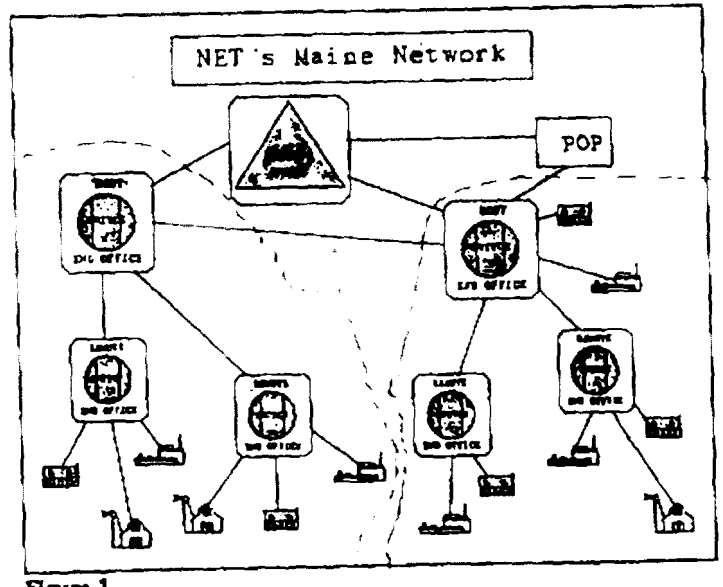


Figure 1

The loop is all Company plant that connects the end office to the customer premises. Typically it is comprised of the feeder and associated electronics that goes from the end office to the distribution interface, the distribution, and the drop wire from the curb to the customer's premises. The loop will often be referred to in this study as the subscriber or customer line.

The end office is a portion of Company plant located inside a wire center. A wire center is a building housing termination equipment for loops, the switch, termination equipment for interoffice facilities, and termination equipment for dedicated transport facilities. The plant that is categorized as end office plant includes the switch, distributing frame for the switch, line termination equipment, and power equipment.

The Company has two types of end offices: remotes and hosts. Remote end offices connect to customers' lines and to a host switch. Host end offices connect to customers' lines, the remote switches they serve, and to other host switches.

The tandem is a switching office that routes calls solely between other switches. The tandem office equipment consists of the switch and the termination equipment necessary to route calls to and from the tandem and other switches.

Interoffice facilities provide the link between two switching entities. There are four main categories of interoffice facility plant: line haul equipment, fiber optic termination equipment, other termination equipment, and dedicated special circuit equipment. The line haul equipment consists of the fiber optic cable and signal regeneration equipment. The fiber optic termination equipment is located in an end office or tandem office and consists of the electronics that determine the throughput of the fiber and connect to the switch, the other termination equipment, and/or the dedicated special circuit equipment. The other termination equipment is used to convert the digital signals to a format compatible with the switch or dedicated special circuit equipment. Dedicated special circuit equipment is used to terminate loops and line haul equipment such that a dedicated, non-switched path exists between two customer premises. This equipment is used solely to provide *private line service*.

NET's Maine network consists of 122 remote switches whose primary functional responsibility is to provide dial tone to

customers. In turn, these *remote* switches are connected to 14 host switches throughout Maine by fiber optic cable. The host switches also have a functional responsibility to provide dial tone to their customers. The average distance from a remote switch to a host switch is 30 miles.

The increased efficiency and lower cost of fiber optic cable and digital technology has allowed NET to reduce the number of switching tiers from three to, in most cases two.

The host switches, and the one pure tandem switch, are interconnected in a backbone network of fiber optic trunk facilities. The average distance between the host switches is 65 miles.

In performing its task of transmitting information from one point to another, the Company's network can be viewed as three functions. Access to the network as represented by the subscriber loop, switching as represented by the end offices, and transport as represented by the interoffice facilities.

The subscriber loop allows information to pass to or from a customer's premises to the gateway of the network, the switch. From the switch, the message may be routed to another subscriber loop if the message is to someone connected to the same switch, or into the transport portion of the network if the recipient is connected to another switch.

In designing the network, the location and type of switches depend on where the customers are located and the cost of transport. Historically, the Company located end offices in the center of town, consistent with the density of customers.

In addition to switches that directly serve customers, however, there are switches that route calls between other switches, as well as serving their own customers directly. The number of these *host* switches, and their location, is a function of the relative costs of switching and transport.

With the availability of fiber optic cable and digital technology, the cost of transport, in terms of cost per unit (minute or minute/mile), has become very low (See Table 2).

Within this decade, all but two of NET's switches in Maine will be digital. The increased efficiency and lower cost of fiber optic cable and digital technology has allowed NET to reduce the number of switching tiers from three to, in most cases two.

The cost of providing a particular call depends on the parts of the network it uses. Since, relatively speaking, switching is expensive and transport is cheap, it makes economic sense to route a call that is perhaps sixty airline miles over 120 network miles because it minimizes the number of switching points through which the call must go. By hauling calls longer distances, more calls can be completed through a common switch, which reduces the number of switch points and the cost.

Marginal Cost Study Description

Introduction

The Company considered a variety of approaches for the methods used in the study. The Company weighed the alternatives with two major points in mind.

The first point the Company kept in mind when selecting marginal cost methods was that its marginal costs are determined by the network it has in place today and the one it expects to have in the future. This led to the criterion that the marginal cost method selected should reflect the marginal costs of the Company's Maine network. Some marginal cost methodologies presume that a company should construct a network *de novo*. This presumption may or may not result in a lower marginal cost for a particular segment of the telecommunication's network, but it likely does not reflect the Company's marginal costs. Therefore, the Company favored methods that reflected the Company's cost to increase its capacity to provide additional units of service using the technologies it is installing now to provide service in the future.

Second, the Company favored simplicity in method over complexity when there is no significant loss of precision in the results. Simpler methods will inform rate design as well as complex methods since the constraints of revenue requirements and rate continuity effectively limit the degree to which marginal-cost-based rates can be adopted.

Based upon experience, the Company knew that whichever method the Company selected from the range of reasonable methods for calculating marginal costs, the results were going to show that

marginal costs, in aggregate, are far below embedded costs, and, generally, far below what rates must be, in aggregate, to meet the Company's revenue requirement. Thus, while the determination of marginal costs is important for purposes of establishing prices, the precision that can be reflected in rates is limited.

Simplicity in selection of marginal cost methods provides other benefits as well. One of the most important benefits is cost savings. Simpler methods save money since they are less costly to produce. Additionally, simpler methods allow more cogent discussion of important issues since the method could be more readily explained and understood. The Company in no case chose simplicity for simplicity's sake alone.

The methods the Company ultimately selected to determine the marginal costs of its network functions - access, switching, and transport - were developed from and confirmed by its actual investments and engineering plans. For example, to determine the subscriber line costs associated with a loop, the Company went to its Maine engineers and asked them how they designed a loop and why. The Company then researched its records to determine the typical loop design. The result is that the Company's typical loop is almost a perfect match for the engineers' design criteria, which are in turn a function the cost of the various components, and their design alternatives, of the loop.

Goal and Objectives

The goal of the MCS is to determine the marginal cost of adding an additional unit of capacity. NET adds capacity to give its customers the service they want. Generally, NET provides two types of *services*[1].

[1] There is clearly a difficulty with the word service; it has been used many ways to mean many things. It is, however, the best descriptor of the concept the Company is trying to define. Unless otherwise specified, the word service (in italics) will mean a unique end service, for example, the ability to call from one point to another. The MCS will not use it to mean all of the different products that might provide the unique end service, like, for example, toll and local exchange service.

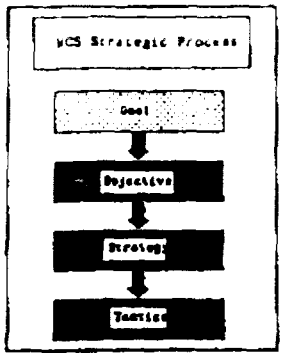


Figure 2

One type of *service* is to transmit information from one point to another. This is the fundamental objective of the telecommunications network. For the purposes of this study, the MCS will call this *network service*.

The other type of *service* is *adjunct services*, which support *network service*. For example, directory assistance provides a customer with the ability to find out how to reach other customers. Operator handled service provides assistance in completing calls. These *adjunct services* are important and allow customers to use the fundamental *network service* better. Without the *network service*, however, the *adjunct services* would be meaningless.

In summary, then, the goal of the MCS was to answer the question, "What does it cost to provide an additional unit of service capacity?" The objectives were to determine the marginal capacity costs for *network service* and for *adjunct services*. The strategy NET employed to meet the goal and these objectives is described below.

Strategy and Tactics

The strategy to achieve the goal and the objectives comprised three activities:

- Collection of cost information
- Development of marginal costs
- Aggregation of marginal costs into meaningful groups.

These activities were not necessarily serial in nature; for example, cost information would be identified initially, and then as the specific method for developing the marginal cost was solidified, new or more detailed cost information might be required. The strategy was implemented through tactics for each of the three activities. To visualize the entire process described here, Figure 3 is displayed below.

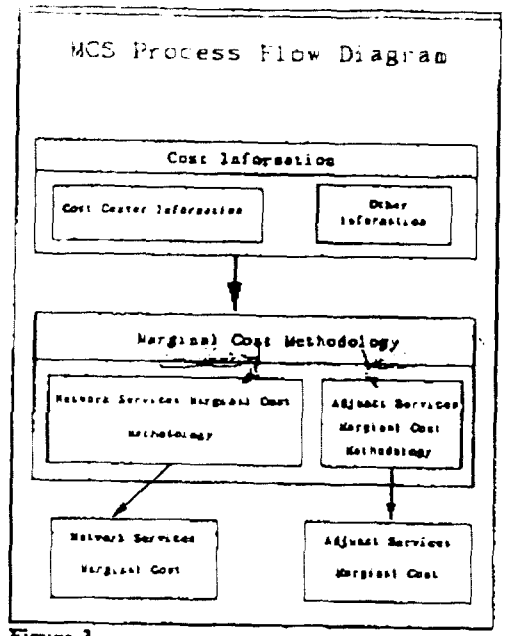


Figure 3

The Company needed a way to organize its costs for purposes of accessing them in some orderly manner for calculating marginal costs. It did this by first identifying the cost information it needed and then organizing that information into conceptual groups.

The Company determined the network cost centers by the physical parts of its network. The network cost centers the Company identified are:

- End Office
- Tandem Office
- Interoffice Facilities
- Loop

The Company determined its adjunct costs centers by examining the *adjunct services* it provides. Each *adjunct service* became its own cost center, with its own calculation of marginal costs. The basic adjunct cost centers the Company studied are[2]:

- Billing Inquiry and Production
- Operator Handled Services
- Directory Assistance
- Intercept Services
- Nonrecurring Costs for Basic Exchange and Private Line

Network Marginal Costs

The Company used a five step method for developing the marginal costs of *network service*. The marginal cost of *network service* requires that the Company calculate the marginal costs of additional investment, as well as the expenses the Company incurs in maintaining and operating that investment.

The MCS completed each of five steps for each of the network cost centers. The five steps are described below. A more detailed discussion occurs in the MCS Cost Center Overview in Part 2, and in the MCS Detail in Part 3.

The first step was to determine the amount of investment required in the given cost center and the amount of capacity that investment would buy. This step required the Company to identify the cost drivers associated with each cost center, and the network function associated with each cost driver. A cost driver is the aspect of *network service* that caused the Company to incur the added costs under study in the cost center.

For example, investment in the end office is driven by the need for additional lines, additional call carrying capacity, or additional interswitch connections. These cost drivers are associated with the network functions of access ($ per line), switching ($ per minute), and transport ($ per minute and $ per minute per circuit mile).

Clearly the Company has more adjunct cost centers, and *adjunct services*, than these. The Company selected these *adjunct services* for study believing that they represent the greatest interest to the Commission and other interested parties.

respectively. Table 1 shows each cost driver and its associated function by network cost center.

Table 1 Cost Drivers By Cost Center	
Cost Center	Cost Drivers
Loop	Lines
End Office	Lines Minutes of Use Trunks
Interoffice Facilities	Trunks Miles Minutes of Use
Tandem Office	Trunks Minutes of Use

The Company determined the amount of investment and associated capacity using two approaches, each appropriate to the cost center and function under study. For some cost centers the Company determined the additional investment and associated capacity the Company planned to add in the future. For other cost centers the Company determined typical plant used in the cost center and the cost and capacities associated with the plant. Each of these approaches is discussed below.

For end offices, tandem offices, and most interoffice facilities the Company went to its planning program records to determine the cost of the capacity it planned to add in the next four years. Each time the Company's engineers plan to add capacity they specify the costs, the reasons for adding the capacity, the expected life of the capacity, and the amount of capacity added. The Company used these cost records for every addition planned in the next four years as the basis for calculating the marginal costs in each of these cost centers.

For the loop and some particular special facilities that serve only private line customers, the Company went to its engineers to determine their practices for adding capacity in Maine. The Company checked the information provided by the engineers against its recent records of what it had installed to ensure that the engineers' stated design practices were in fact implemented in the actual construction of the Company's network. With the confirmation that the design practices were in fact represented in the typical loop and interoffice facilities under study, the Company then determined from its cost records the actual cost and capacity of each component within the cost area.

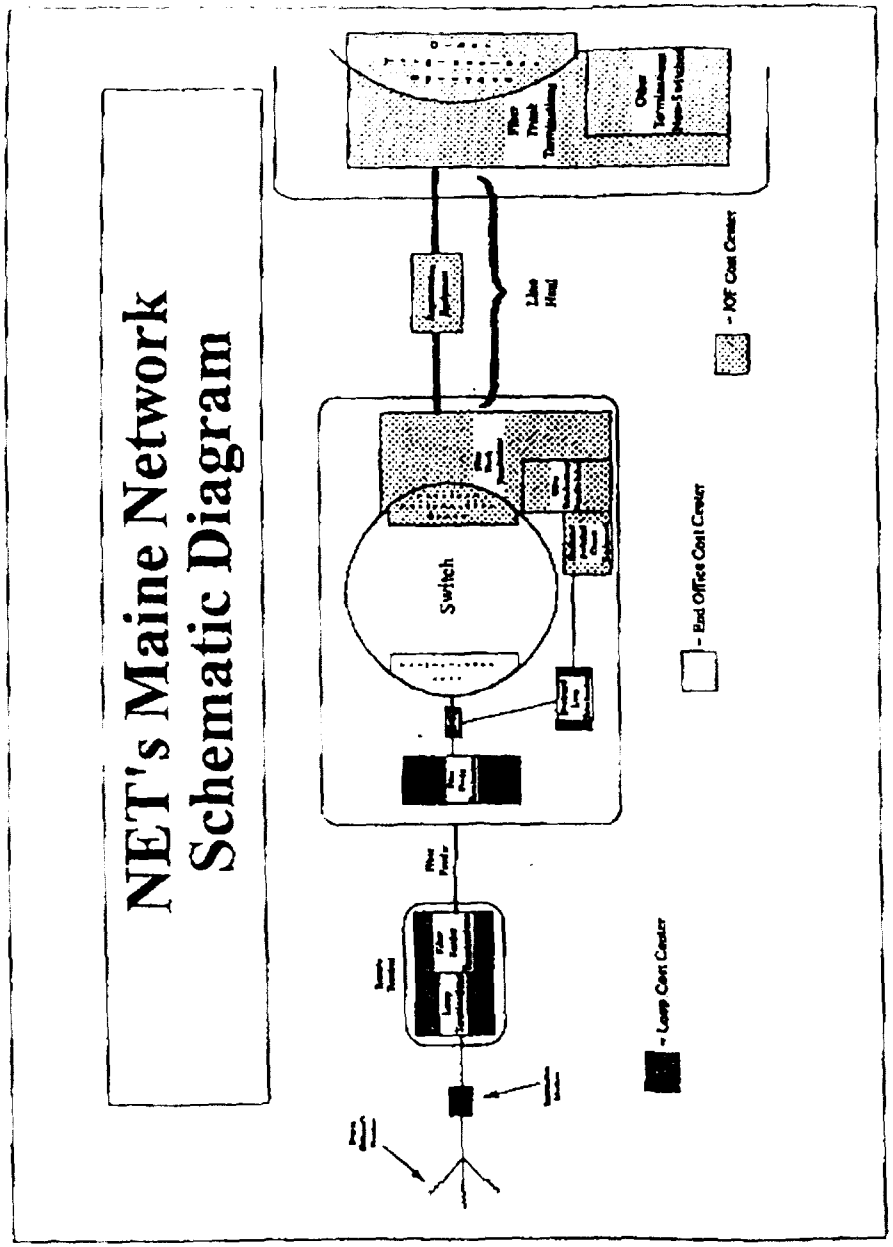
The second step was to determine the present value for each of the investments made in the cost center. For the end offices, tandem offices, and most interoffice facilities, this meant calculating the present value for many investment additions. For the loop and certain private line facilities, the Company assumed that investments in each component had to be made immediately.

The third step was to develop and apply the cost factors for the particular type of investment to convert investment costs to annual costs. Both the capital cost factors and the expense cost factors were determined specifically for the particular equipment in the cost center.

The fourth step was to convert the annual costs to annual unit costs. This was done by dividing the investment cost by the capacity associated with the investment. Where more than one investment in additional capacity was considered, the unit cost associated with each capacity addition was weighted by the units added to produce a weighted average marginal cost across all capacity additions.

The units associated with the switching and some transport functions are expressed in cost per busy hour CCS[3] (BH CCS) or BH CCS per circuit mile. CCS of capacity are added to meet demand during the busy hour. The term BH CCS is used in the MCS as the raw unit of capacity added for most traffic sensitive investment. A BH CCS represents a capacity addition that allows the Company to provide an additional 100 seconds of calling during the busy hour through the particular piece of equipment under study.

[3] CCS stands for hundred (cent) call seconds. It is a measure of the capacity of a switch or portion of the interoffice facilities to handle communications throughput. It is a result of the multiplexing and electronic technologies used in switches and interoffice facilities that allow a single path to handle more than one message at a time.



While NET may be able to determine that a particular switch will have a peak traffic load on Thursdays between 3 p.m. and 4 p.m., it has other switches that peak in the morning on Mondays and later in the day on Wednesdays. This characteristic of the telecommunications network makes the expression of the network's marginal costs unique.

Therefore, NET converted BH CCS for switching and transport to a cost per peak period minute by multiplying the BH CCS by .6 (100 seconds x .6 = 60 seconds = 1 minute) to obtain the cost of providing an additional minute of calling during the busy hour (BH Minute), and then assumed each hour in the peak period had an equal probability of being the busy hour with regard to the portion of the network a customer would use when making a call. This equal probability assumption required that the BH minute cost be divided by the number of hours in the peak period (251 days x 10 hours per day). This result stated, effectively, the expected cost to NET of adding capacity to provide another minute of calling in any peak period hour. The peak period consists of 251 business days and 12 hours in a peak day (9:00 A.M. to 9:00 P.M.) minus the noon hour and 5 to 6 P.M.

The fifth step, where necessary, was to convert the marginal costs for each addition into a meaningful number based on the units expected to be related to tariff items for which the Company could realistically expect to charge. In the case of costs functionalized as access, this conversion was not necessary since the costs were already expressed on a per line basis. Similarly, costs for dedicated interoffice facilities (used for private line service only) could be expressed on a per circuit basis.

The network marginal costs, calculated by cost center, are shown in Table 2.